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**Identification of
Generalizable Skills in
Secondary Vocational
Programs**

**Illinois
State Board of
Education**

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**Adult
Vocational and
Technical Education**

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**Identification of
Generalizable Skills in
Secondary Vocational
Programs**

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Introduction

During recent years increased public attention has focused on the skills and abilities needed to participate in our society. Skills required to live independently and to obtain gainful employment have become more emphasized in both educational settings and the world of work. In particular, the field of vocational education has begun to focus attention in the area of basic skills. Acquisition of basic skills is commonly believed to be necessary for success in vocational training programs and occupations.

Several recent studies have focused on the concept of transferable skills as applied to occupations, vocational programs, or skills that differentiate people from one another (McKinlay, 1976; Altman, 1976; Sticht, 1978; Mikulecky & Diehl, 1979; Moe, Rush, & Storlie, 1979; Boyd & Cline, 1981; Moorehouse, 1981; Harding, 1981, Baker, 1981). The concept of transferable or generalizable skills appears to be largely an unmet and important need with significant implications for what and how vocational education is provided in the future. Skills, knowledge, and attitudes involved in vocational training programs and employment settings are learned behaviors and are all potentially generalizable. However, no single, definitive, and agreed upon list exists, but there appears to be considerable consensus on many partial lists. Pratzner (1978) and Ashley and Ammerman (1978) claimed: (a) objective or non-arbitrary criteria do not seem to exist to decide whether one list is better or more valid than another, (b) items on many lists appear to be of equal importance, (c) several skills or attitudes somehow seem non-specific, vague, or reduced to a simple level of specificity, (d) the

lists do not reflect adequately if at all the interrelationships, specificity, richness, and complexity of some skills and combinations of skills, and (e) it is very difficult to cross-reference items in several lists or to combine or consolidate lists. These claims seem substantiated in the present review of literature. In addition, the skills identified in most studies have been drawn almost exclusively from employment settings. Minimal research regarding generalizable skills has focused on vocational training programs or the combined skill requirements of vocational programs and occupations.

Several research studies have reviewed, identified, analyzed, and summarized transferable or generalizable skills and have concluded that there were five skill areas which appear highly generalizable: (a) mathematics, (b) communications, (c) interpersonal relations, (d) reasoning, and (e) manipulative (Sjogren, 1977; Kawula & Smith, 1975; Greenan & Smith, 1981, Greenan, 1982). These skill areas include problem solving, decision making, social skills of work (e.g., work habits, attitudes, and values) and technical skills. Similar skill areas and skills need to be specified and developed to high levels of mastery in students (Pratzner, 1981). Students need to be informed of the skills they have acquired and their level of proficiency, and those skills not acquired or not developed that are necessary for continued training and employment success.

Purpose of the Study

The central problem investigated in this study was to determine the skill areas and skills that were generalizable within and across the secondary vocational training programs in the 32 area vocational centers (AVC) in the State of Illinois. The specific research problem was to

(a) develop, validate, and determine the reliability of a generalizable skills instrument, and (b) identify which mathematics, communications, interpersonal relations, reasoning skills, and other skills were generalizable within and across all secondary agricultural; business, marketing, and management; health; home economics; and industrial occupations training programs. In order to resolve the research problem the following objectives were developed:

1. Identify and validate a list of skills which is potentially generalizable and related to success in secondary vocational training programs.
2. Construct a survey questionnaire to assess the relative importance of a list of skills as it relates to the content of secondary vocational training programs.
3. Determine the reliability of the Generalizable Skills Importance Questionnaire in terms of internal consistency reliability.
4. Identify the skill areas and skills that are generalizable within and across secondary vocational training program areas and programs.

Population

The population for this study consisted of the 593 secondary vocational training teachers in the thirty-two (32) AVCs in the State of Illinois. All teachers in each of the five (5) vocational training program areas were chosen to participate and included: agricultural occupations; business, marketing, and management occupations; health occupations; home economics occupations; and industrial occupations.

Instrumentation

The instrument development process included a comprehensive review of the literature to identify skills in previous research studies. An initial draft list was developed that included four (4) skill areas and 102 skills: (a) 26 mathematics skills, (b) 30 communications skills, (c)

18 interpersonal relations skills, and (d) 28 reasoning skills. The draft list of skills was reviewed by the project advisory committee, survey research laboratory personnel at the University of Illinois, a sample of AVC directors and teachers, and a sample of employers/employees. Based on the reviewers' comments, additions, and/or deletions in terms of content, meaning, clarity, and readability a final list of skills was produced which was (a) perceived to possess both content and face validity, and (b) potentially generalizable and related to success in secondary vocational training programs.

The previously identified list of generalizable skills was used as the basis for writing items and constructing the "Generalizable Skills Importance Questionnaire (GSIQ)." The GSIQ which contained a seven-point Likert-Type scale based on "degree of importance," was designed to survey secondary vocational training teachers in order to determine the skills that were perceived as most necessary or important for students to successfully perform in their respective programs. The GSIQ was also intended to identify skills that were generalizable within and across several secondary vocational training program areas and programs.

The project advisory committee members, survey research laboratory personnel, and a sample of ten (10) AVC directors and teachers reviewed and critiqued the GSIQ. The purpose of this procedure was to (a) identify additional skills, and (b) determine whether the reviewers understood the directions and items in terms of content, meaning, clarity, and readability. Based on the reviewers' comments, additions, and/or deletions, the necessary revisions were made. The final version of the GSIQ was then produced and perceived to possess

both content and face validity, and to be potentially capable of reliably measuring the importance of generalizable skills relative to success in secondary vocational training programs.

Data Collection

Information regarding the types and number of vocational training program areas, programs, and numbers of teachers were collected from the 32 secondary AVC directors in the State of Illinois. During the fourth week of October, 1982, each of the AVC directors received a cover letter; a GSIQ for each teacher in his center; instructions for distributing, collecting, and returning the GSIQs; and a self-addressed mailing envelope for returning the completed GSIQs. The directors were instructed to distribute a GSIQ to each teacher, collect the GSIQs, and return the completed GSIQs by the third week of November, 1982. At that time, a follow-up telephone call was made to each non-responding director. The data collection process was concluded during the third week of December, 1982. Each of the 32 (100%) AVC directors returned a package of completed GSIQs. Four hundred and eighty-nine (489) or 82.46% of the total number of 593 AVC teachers across the vocational training program areas and programs completed GSIQs, and each GSIQ was usable.

Data Analysis

The data obtained from the GSIQs were analyzed individually and collectively by program area, program, skill area, and skill. Descriptive statistics were used to analyze, explain, and discuss the data. Means, standard deviations, sample sizes, and reliability coefficients were computed using the Statistical Packages for the Social Sciences (SPSS) (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975).

The reliability of the GSIQ was determined in terms of internal consistency reliability. Internal consistency reliability generally refers to the consistency or homogeneity of performance over all items on an instrument or scale within an instrument (Nunnally, 1978). The coefficient of internal consistency indicates the degree to which the items intercorrelate. Thus, the higher the coefficient of internal consistency, the greater is the instrument's capability of consistently and accurately measuring the trait(s) which it intends to measure. The rationale for these analyses suggested that if the teachers were rating the skills accurately and consistently, there should be high internal consistency reliability coefficients for the Generalizable Skills Importance Questionnaire within and across vocational training program areas. Cronbach's Coefficient Alpha (Cronbach, 1971) which is based on the average correlation among items within an instrument was used to estimate the internal consistency of the GSIQ. Internal consistency reliability coefficients of .80 or greater for measuring instruments are usually considered adequate (Nunnally, 1978). Therefore, for this study, an individual skill area or total instrument coefficient of .80 or larger was considered adequate and acceptable.

The GSIQs provided descriptive data which related the relative importance, as perceived by vocational teachers, of a list of skills in terms of being necessary for students to successfully perform in the vocational training programs in which they were enrolled. The teachers' responses from the seven-point importance scale which used three anchors (not important, moderately important, very important) were collectively translated into levels of skill generalizability and need that included: (a) low, $\bar{x}=1.00-2.99$, (b) medium, $\bar{x}=3.00-5.00$, and (c)

high, $\bar{x}=5.01-7.00$. Thus, the levels of skill generalizability and need were identified and described within and across program areas, programs, skill areas, and skills.

Results

The general findings and conclusions of this study include:

1. The process for identifying the list of generalizable skills was based on a logical plan that included a comprehensive review of the literature, identification of an item pool, analysis and synthesis of items from the pool, and reviews and evaluations of the list by a panel of experts.
2. The GSIQ instrument construction process was based on a logical plan including the selection of the identified list of generalizable skills, development of an appropriate scale for the intended purpose, writing and scaling the items, and writing directions for using the instrument.
3. The internal consistency reliability coefficients for the GS IQ ranged from .90 to .98. These values suggested that the GS IQ skill areas and items, individually and collectively, were very highly accurate and consistent measures of skill generalizability and need. All coefficients were well above .80 and therefore considered adequate and acceptable. The findings suggested that the GS IQ mathematics, communications, interpersonal relations, and reasoning skill areas and skills are reliable measures of generalizable skills within and across secondary agricultural; business, marketing, and management; health; home economics; and industrial occupations vocational training programs.
4. There is a core of mathematics, communications, interpersonal relations, and reasoning skills which are generalizable within and across secondary agricultural; business, marketing, and management; health; home economics; and industrial occupations training programs (See Table 1).

Implications

Vocational education has become increasingly aware of the need to provide all students with appropriately designed individualized instruction and support services necessary to succeed in vocational programs. Students frequently enroll in vocational programs with below average proficiencies in skill areas, such as, reading and mathematics. Typi-

cally, vocational students' skill levels may be one (1) standard deviation below the entire student population. At the same time, reading, mathematics, and other skills may be very important to succeed in vocational training programs and occupations.

Although students may continue to acquire the essential vocational/technical competencies for a given occupation, in many instances they may be unsuccessful in completing their vocational programs and not increase their proficiencies in the generalizable or "basic skill" areas. In addition, vocational education (and other fields) has often used skills and standardized tests to classify students, assess students' learning problems, and guide curriculum development. These tests and procedures frequently have had a questionable relationship to the content of vocational programs. Thus, their reliability and validity are suspect regarding usefulness and application for vocational students and school personnel.

This study attempted to identify those generalizable skills which are basic to, necessary for success in, and transferable or common within and/or across secondary vocational training program areas and programs. The expectation is that the results of this study will provide vocational teachers, administrators, counselors, and other school personnel with information regarding the generalizable skills requirements in vocational training programs. The information should assist in individualized program assessment, planning, implementation, and evaluation. School personnel will become aware and should begin or continue to deal with the problem of providing students with the necessary instruction and support services to successfully complete vocational programs and enter occupations.

This study also provides a basis for eventual development of functional assessment procedures and strategies with which students, teachers, and other school personnel can measure students' generalizable skill levels. The subsequent procedures and instruments could assess learning abilities or diagnose difficulties, and identify those students who may have functional learning problems. The information from such assessments could suggest instructional needs, and provide a basis for determining and delivering the appropriate support services students need to succeed in their chosen vocational programs.

TABLE 1

Generalizability of Mathematics, Communications, Interpersonal Relations,
and Reasoning Skills in Secondary Agricultural; Business, Marketing,
and Management; Health; Home Economics; and Industrial Occupations
Training Programs.

Areas and Programs

	omics Occs.
Interior Decorating	
Child Development	
Cooperative Work Training (CWT)	
All Home Economics Occupations Programs	

Industrial Occupations

Air Conditioning	Heating	Appliance Repair	Automotive Services	Body and Fender Repair	Auto Mechanics	Aircraft Maintenance	Commercial Art	Construction and Building Trades	Carpentry	Industrial Maintenance	Diesel Mechanic	Drafting	Electrical Occupations	Industrial Electrician	Electronic Occupations	Radio/Television Repair	Graphic Arts	Machine Shop	Combine Metal Trades	Welding	Tool and Die Making	Cosmetology	Refrigeration	Small Engine Repair	Millwork and Cabinet Making	Industrial Cooperative Education	Cooperative Work Training (CWT)	Truck Driving	Warehousing	Home Remodeling and Renovation	Custodial Maintenance	Communications and Media Specialist	All Industrial Occupations Programs
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ALL VOCATIONAL TRAINING AREAS AND PROGRAMS

Mathematics Skills

Whole Numbers

1. Read, write, and count single and multiple digit whole numbers
 2. Add and subtract single and multiple digit whole numbers
 3. Multiply and divide single and multiple digit whole numbers
 4. Use addition, subtraction, multiplication, and division to solve numbers
 5. Round off single and multiple digit whole numbers

Fractions

6. Read and write common fractions
 7. Add and subtract common fractions
 8. Multiply and divide common fractions
 9. Solve word problems with common fractions

Decimals

10. Carry out arithmetic computations involving dollars and cents
 11. Read and write decimals in one and more places
 12. Round off decimals to one or more places
 13. Multiply and divide decimals in one or more places
 14. Add and subtract decimals in one or more places
 15. Solve word problems with decimals in one or more places

Percent

- 16. Read and write percents**

17. Compute percents

KE

- High Generalizability ($\bar{x} = 5.01 - 7.00$)
 - Medium Generalizability ($\bar{x} = 3.00 - 5.00$)
 - Low Generalizability ($\bar{x} = 1.00 - 2.99$)

Areas and Programs

Interior Decorating
Child Development
Cooperative Work Training (CWT)

All Home Economics Occupations Programs

Industrial Occupations

ALL VOCATIONAL TRAINING AREAS AND PROGRAMS

Vocational Training Areas and Programs

Agricultural Occs.	Business, Marketing and Management Occs.										Health Occupations					Home Economics Occs.					Industrial Occupations																																																																																																																																																		
	Agricultural Mechanics		Ornamental Horticulture		Agricultural Cooperative Education		Conservation		Cooperative Work Training (CWT)		All Agricultural Occupations Programs					Advertising Services		General Merchandise (Sales)		Personal Services (Sales)		Marketing Cooperative (D.E.)		Accounting and Computing Occupations		Business Data Processing Systems		Computer Programming		Filing, Office Machines		General Office Clerking		Executive Secretary Science		Secretarial		Office Occupations Cooperative Education		Cooperative Work Training (CWT)		Word Processing		Hospitality (Travel and Travel Service)		Clerical Occupations		Office Occupations		All Bus., Market., and Mgmt. Occupations Programs					Dental Assisting		Practical Nursing		Nurse Aide		Health Care Aide		Medical Assisting		Health Aide		Medical Records		Health Occupations Cooperative Education		Cooperative Work Training (CWT)		Health Occupations		All Health Occupations Programs					Child Care		Clothing Management, Production, and Service		Food Management, Production, and Service		Home Economics Cooperative Education		Interior Decorating		Child Development		Cooperative Work Training (CWT)		All Home Economics Occupations Programs					Air Conditioning		Heating		Appliance Repair		Automotive Services		Body and Fender Repair		Auto Mechanics		Aircraft Maintenance		Commercial Art		Construction and Building Trades		Carpentry		Industrial Maintenance		Diesel Mechanic		Drafting		Electrical Occupations		Industrial Electrician		Electronic Occupations		Radio/Television Repair		Graphic Arts		Machine Shop		Combine Metal Trades		Welding		Tool and Die Making		Cosmetology		Refrigeration		Small Engine Repair		Milkwork and Cabinet Making		Industrial Cooperative Education		Truck Driving		Warehousing		Home Remodeling and Renovation		Custodial Maintenance		Communications and Media Specialist		All Industrial Occupations Programs				
Mixed Operations																																																																																																																																																																							
18. Convert fractions to decimals, percents to fractions, fractions to percents, percents to decimals, decimals to percents, common fractions or mixed numbers to decimal fractions, and decimal fractions to common fractions or mixed numbers																																																																																																																																																																							
19. Solve word problems by selecting and using correct order of operations																																																																																																																																																																							
20. Perform written calculations quickly																																																																																																																																																																							
21. Compute averages																																																																																																																																																																							
Measurement and Calculation																																																																																																																																																																							
22. Read numbers or symbols from time, weight, distance, and volume measuring scales																																																																																																																																																																							
23. Use a measuring device to determine an object's weight, distance, or volume in standard (English) units																																																																																																																																																																							

Areas and Programs

All Home Economics Occupations Programs		Industrial Occupations																			
Child Development		Air Conditioning																			
Cooperative Work Training (CWT)		Heating																			
All Home Economics Occupations Programs		Appliance Repair																			
		Automotive Services																			
		Body and Fender Repair																			
		Auto Mechanics																			
		Aircraft Maintenance																			
		Commercial Art																			
		Construction and Building Trades																			
		Carpentry																			
		Industrial Maintenance																			
		Diesel Mechanic																			
		Drafting																			
		Electrical Occupations																			
		Industrial Electrician																			
		Electronic Occupations																			
		Radio/Television Repair																			
		Graphic Arts																			
		Machine Shop																			
		Combine Metal Trades																			
		Welding																			
		Tool and Die Making																			
		Cosmetology																			
		Refrigeration																			
		Small Engine Repair																			
		Millwork and Cabinet Making																			
		Industrial Cooperative Education																			
		Cooperative Work Training (CWT)																			
		Truck Driving																			
		Warehousing																			
		Home Remodeling and Renovation																			
		Custodial Maintenance																			
		Communications and Media Specialist																			
		All Industrial Occupations Programs																			

Vocational Training Areas and Programs

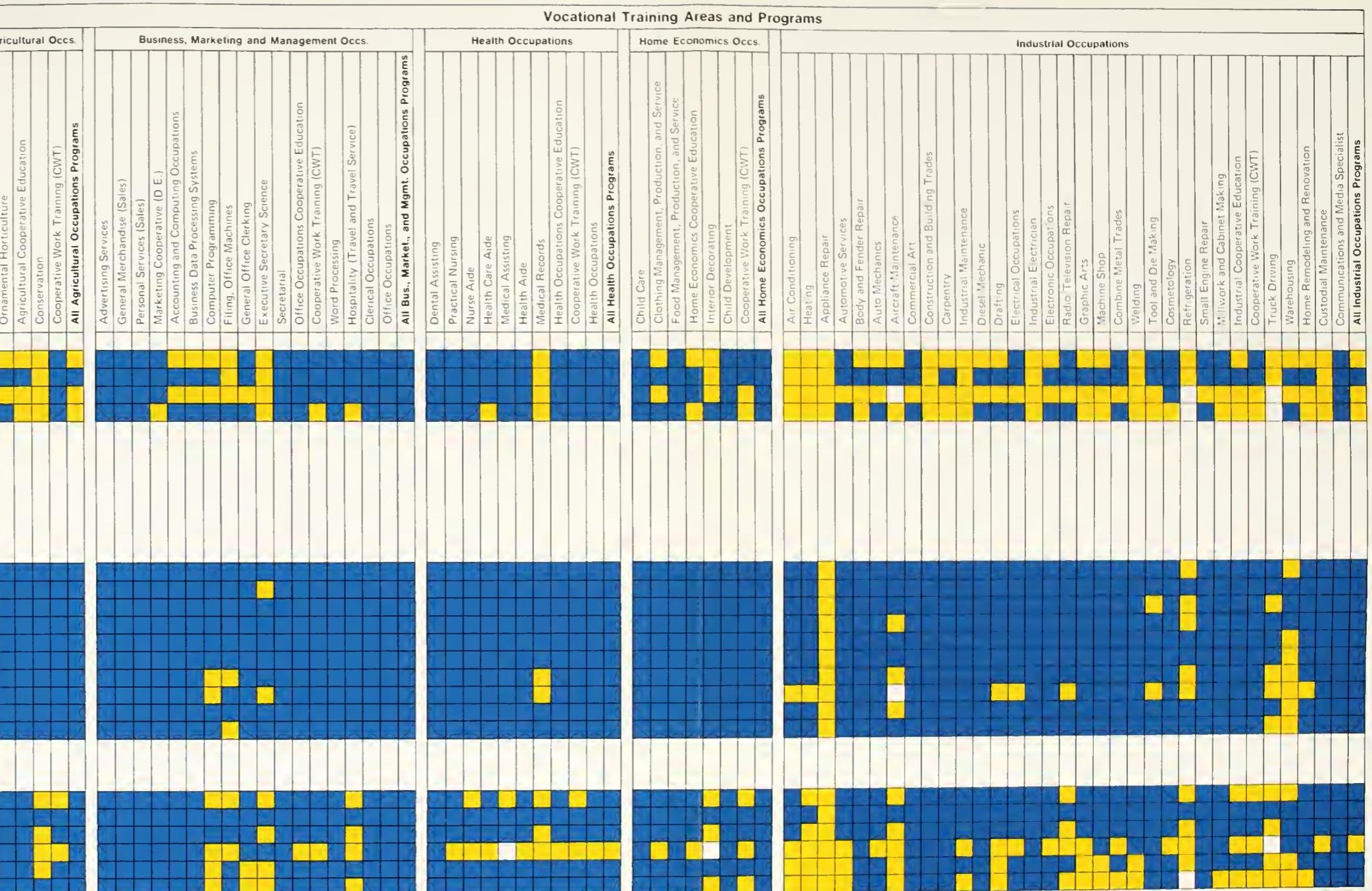
ALL VOCATIONAL TRAINING AREAS AND PROGRAMS

Areas and Programs

Economics Occs.		Industrial Occupations																			
		Industrial Occupations																			
Interior Decorating		Air Conditioning																			
Child Development		Heating																			
Cooperative Work Training (CWT)		Appliance Repair																			
All Home Economics Occupations Programs		Automotive Services																			
		Body and Fender Repair																			
		Auto Mechanics																			
		Aircraft Maintenance																			
		Commercial Art																			
		Construction and Building Trades																			
		Carpentry																			
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		Electronic Occupations																			
		Radio/Television Repair																			
		Graphic Arts																			
		Machine Shop																			
		Combine Metal Trades																			
		Welding																			
		Tool and Die Making																			
		Cosmetology																			
		Refrigeration																			
		Small Engine Repair																			
		Millwork and Cabinet Making																			
		Industrial Cooperative Education																			
		Cooperative Work Training (CWT)																			
		Truck Driving																			
		Warehousing																			
		Home Remodeling and Renovation																			
		Custodial Maintenance																			
		Communications and Media Specialist																			
		All Industrial Occupations Programs																			

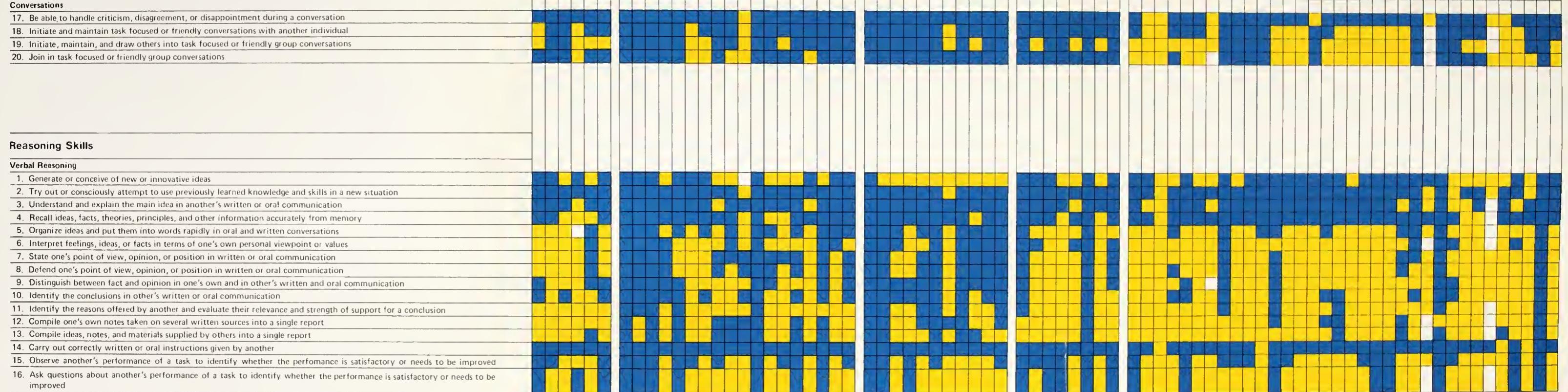
ALL VOCATIONAL TRAINING AREAS AND PROGRAMS

Vocational Training Areas and Programs



Areas and Programs	
Home Economics Occs.	Industrial Occupations
Interior Decorating	
Child Development	
Cooperative Work Training (CWT)	
All Home Economics Occupations Programs	
Air Conditioning	
Heating	
Appliance Repair	
Automotive Services	
Body and Fender Repair	
Auto Mechanics	
Aircraft Maintenance	
Commercial Art	
Construction and Building Trades	
Carpentry	
Industrial Maintenance	
Diesel Mechanic	
Drafting	
Electrical Occupations	
Industrial Electrician	
Electronic Occupations	
Radio/Television Repair	
Graphic Arts	
Machine Shop	
Combine Metal Trades	
Welding	
Tool and Die Making	
Cosmetology	
Refrigeration	
Small Engine Repair	
Millwork and Cabinet Making	
Industrial Cooperative Education	
Cooperative Work Training (CWT)	
Truck Driving	
Warehousing	
Home Remodeling and Renovation	
Custodial Maintenance	
Communications and Media Specialist	
All Industrial Occupations Programs	

ALL VOCATIONAL TRAINING AREAS AND PROGRAMS



KEY

- High Generalizability ($\bar{x} = 5.01 - 7.00$)
- Medium Generalizability ($\bar{x} = 3.00 - 5.00$)
- Low Generalizability ($\bar{x} = 1.00 - 2.99$)

Conversations

17. Be able to handle criticism, disagreement, or disappointment during a conversation
18. Initiate and maintain task focused or friendly conversations with another individual
19. Initiate, maintain, and draw others into task focused or friendly group conversations
20. Join in task focused or friendly group conversations

Reasoning Skills

Verbal Reasoning

1. Generate or conceive of new or innovative ideas
2. Try out or consciously attempt to use previously learned knowledge and skills in a new situation
3. Understand and explain the main idea in another's written or oral communication
4. Recall ideas, facts, theories, principles, and other information accurately from memory
5. Organize ideas and put them into words rapidly in oral and written conversations
6. Interpret feelings, ideas, or facts in terms of one's own personal viewpoint or values
7. State one's point of view, opinion, or position in written or oral communication
8. Defend one's point of view, opinion, or position in written or oral communication
9. Distinguish between fact and opinion in one's own and in other's written and oral communication
10. Identify the conclusions in other's written or oral communication
11. Identify the reasons offered by another and evaluate their relevance and strength of support for a conclusion
12. Compile one's own notes taken on several written sources into a single report
13. Compile ideas, notes, and materials supplied by others into a single report
14. Carry out correctly written or oral instructions given by another
15. Observe another's performance of a task to identify whether the performance is satisfactory or needs to be improved
16. Ask questions about another's performance of a task to identify whether the performance is satisfactory or needs to be improved

Areas and Programs

Economics Occs.			
		Industrial Occupations	
		All Home Economics Occupations Programs	
Interior Decorating	Air Conditioning		
Child Development	Heating		
Cooperative Work Training (CWT)	Appliance Repair		
All Home Economics Occupations Programs	Automotive Services		
	Body and Fender Repair		
	Auto Mechanics		
	Aircraft Maintenance		
	Commercial Art		
	Construction and Building Trades		
	Carpentry		
	Industrial Maintenance		
	Diesel Mechanic		
	Drafting		
	Electrical Occupations		
	Industrial Electrician		
	Electronic Occupations		
	Radio/Television Repair		
	Graphic Arts		
	Machine Shop		
	Combine Metal Trades		
	Welding		
	Tool and Die Making		
	Cosmetology		
	Refrigeration		
	Small Engine Repair		
	Millwork and Cabinet Making		
	Industrial Cooperative Education		
	Cooperative Work Training (CWT)		
	Truck Driving		
	Warehousing		
	Home Remodeling and Renovation		
	Custodial Maintenance		
	Communications and Media Specialist		
	All Industrial Occupations Programs		

ALL VOCATIONAL TRAINING AREAS AND PROGRAMS

Vocational Training Areas and Programs

Vocational Training Areas and Programs

Business, Marketing and Management Occs.		Health Occupations		Home Economics Occs.		Industrial Occupations	
Advertising Services	Dental Assisting	Clothing Management, Production, and Service	Air Conditioning	Appliance Repair	Automotive Services	Electrical Occupations	Small Engine Repair
General Merchandise (Sales)	Practical Nursing	Food Management, Production, and Service	Heating	Body and Fender Repair	Body Mechanics	Industrial Electrician	Radial/Television Repair
Personal Services (Sales)	Nurse Aide	Home Economics Cooperative Education	Automotive	Auto Mechanics	Aircraft Maintenance	Carpentry	Graphic Arts
Marketing Cooperative (D.E.)	Health Care Aide	Interior Decorating	Commercial Art	Commercial Art	Construction and Building Trades	Industrial Maintenance	Machine Shop
Accounting and Computing Occupations	Medical Assisting	Child Development	Art	Art	Car	Diesel Mechanic	Combine Metal Trades
Business Data Processing Systems	Health Aide	Cooperative Work Training (CWT)	Electronics	Electronics	Maintenance	Drafting	Welding
Computer Programming	Medical Records	Health Occupations Cooperative Education	Industrial	Industrial	Trades	Tool and Die Making	Tool
Filing, Office Machines	Health Occupations	Cooperative Work Training (CWT)	Electronics	Electronics	Electronics	Refrigeration	Refrigeration
General Office Clerking	Office Occupations	Health Occupations	Industrial	Industrial	Industrial	Small Engine	Small Engine
Executive Secretary Science	Clerical Occupations	Programs	Electronics	Electronics	Electronics	Repair	Repair
Secretarial	Office Occupations	All Health Occupations Programs	Industrial	Industrial	Industrial	Warenousing	Warenousing
Office Occupations Cooperative Education	Cooperative Work Training (CWT)	All Home Economics Occupations Programs	Electronics	Electronics	Electronics	Home Remodeling and Renovation	Home Remodeling and Renovation
Cooperative Work Training (CWT)	Word Processing	Air Conditioning	Industrial	Industrial	Industrial	Custodial Maintenance	Custodial Maintenance
Ward Processing	Hospitality (Travel and Travel Service)	Heating	Electronics	Electronics	Electronics	Communications and Media Specialist	Communications and Media Specialist
Hospitality (Travel and Travel Service)	Clerical Occupations	Automotive	Industrial	Industrial	Industrial	All Industrial Occupations Programs	All Industrial Occupations Programs
Clerical Occupations	Office Occupations	Commercial	Electronics	Electronics	Electronics	Truck Driving	Truck Driving
All Agricultural Occupations Programs	All Bus., Market., and Mgmt. Occupations Programs	All Health Occupations Programs	All Home Economics Occupations Programs	All Industrial Occupations	All Vocational Training Areas and Programs		

Problem Solving

17. Recognize or identify the existence of a problem given a specific set of facts
 18. Ask appropriate questions to identify or verify the existence of a problem
 19. Enumerate the possible causes of a problem
 20. Use efficient methods for eliminating the causes of a problem
 21. Judge the credibility of a source of information
 22. Identify important information needed to solve a problem
 23. Identify other's and one's own assumptions relating to a problem
 24. Generate or conceive of possible alternative solutions to a problem
 25. Describe the application and likely consequences of possible alternative problem solutions
 26. Compare the application and likely consequences of alternative problem solutions and select a solution that represents the best course of action to pursue

Planning

27. Sort objects according to similar physical characteristics including shape, color, and size
 28. Estimate weight of various objects of different shapes, sizes and makeup
 29. Estimate length, width, height, and distance between objects
 30. Use the senses of touch, sight, smell, taste, and hearing
 31. Set priorities or the order in which several tasks will be accomplished
 32. Set the goals or standards for accomplishing a specific task
 33. Enumerate a set of possible activities needed to accomplish a task
 34. Determine how specific activities will assist in accomplishing a task
 35. Select activities to accomplish a specific task
 36. Determine the order of the activities or step-by-step process by which a specific task can be accomplished
 37. Estimate the time required to perform activities needed to accomplish a specific task
 38. Locate information about duties, methods, and procedures to perform the activities needed to accomplish a specific task
 39. Locate information and select the materials, tools, equipment, or other resources to perform the activities needed to accomplish a specific task
 40. Revise or update periodically plans and activities for accomplishing a specific task

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